

CLAIMS

WHAT IS CLAIMED IS:

- 1 1. A method for removing organic sulfur compounds from a vent gas stream
- 2 comprising the following steps:

3 contacting the vent gas stream with liquid hydrocarbon stream; and
4 absorbing a portion of the organic sulfur compounds from the vent gas
5 stream into the liquid hydrocarbon stream to form an exiting vent gas stream.

1 2. The method as described in claim 1, wherein the liquid hydrocarbon stream
2 comprises one or more liquid hydrocarbons.

1 3. The method as described in claim 2, wherein the hydrocarbon stream
2 comprises two or more liquid hydrocarbons.

1 4. The method as described in claim 1, wherein at least one of the liquid
2 hydrocarbons having a boiling point of between about 180°F and about 430 °F.

1 5. The method as described in claim 4, wherein the at least one of the liquid
2 hydrocarbons comprises benzene, xylene, toluene, hexane, heptane, octane, nonane, or
3 mixtures thereof.

1 6. The method as described in claim 4, wherein the at least one of the liquid
2 hydrocarbons comprises a hydrogenated naphtha.

1 7. The method as described in claim 1, wherein the sulfur concentration of the
2 exiting vent gas stream is less than one percent of the sulfur concentration of the vent gas
3 stream.

1 8. The method as described in claim 7, wherein the sulfur concentration is less
2 than 0.5% of the sulfur concentration of the vent gas stream.

1 9. The method of claim 1 further comprising after step (b):
2 hydrotreating the hydrocarbon stream.

1 10. The method of claim 1 further comprising after step (b):
2 routing the exiting vent gas stream to an incinerator or a heater.

1 11. The method of claim 1, wherein the organic sulfur compound removed is a
2 sulfide.

1 12. The method of claim 11, wherein the organic sulfur compound removed is a
2 disulfide oil.

1 13. A method for removing organic sulfur compounds from a vent gas stream
2 having organic sulfur compounds, the vent gas stream further having an initial organic sulfur
3 compound concentration, comprising the following steps:

4 (a) providing a scrubber, the scrubber having a shell, the shell having
5 an interior cavity, a diameter, a vent gas entry port, a vent gas exit port, and a
6 hydrocarbon entry port;

7 (b) introducing a hydrocarbon stream into the scrubber through the
8 hydrocarbon entry port;

9 (c) introducing the vent gas stream into the scrubber through the vent
10 gas entry port;

11 (d) absorbing a portion of the organic sulfur compounds from the vent
12 gas stream into the hydrocarbon stream to form an exiting vent gas stream; and

13 (e) removing the exiting vent gas stream from the scrubber through the
14 vent gas exit port.

1 14. The method of claim 13, wherein the scrubber further comprises gas/liquid
2 contact material, the gas/liquid contact material within the interior cavity of the scrubber.

1 15. The method of claim 14, wherein the gas/liquid contact material comprises
2 packing, trays, or fiber film contactor.

1 16. The method of claim 15, wherein the gas/liquid contact material comprises
2 structured packing or ring-shaped packing.

1 17. The method of claim 16, wherein the gas/liquid contact material comprises
2 either raschig rings or nutter rings, the raschig rings or nutter rings having a diameter.

1 18. The method of claim 17, wherein the raschig rings or nutter rings are
2 comprised of carbon steel, stainless steel, carbon, or ceramic.

1 19. The method of claim 17, wherein the raschig rings or nutter rings have a
2 nominal diameter of between 1/2" and 2".

1 20. The method of claim 14, wherein the scrubber further comprises a packing
2 support, the packing support located within the interior cavity of the shell and able to
3 support the gas/liquid contact material.

1 21. The method of claim 13, wherein the diameter of the shell is between about
2 6" and 24".

1 22. The method of claim 13, wherein the shell comprises carbon steel, stainless
2 steel, ceramic, or an Inconel alloy.

1 23. The method of claim 13, wherein the scrubber further comprises a liquid
2 distributor, the liquid distributor located within the interior cavity of the shell and in the
3 same plane as the diameter of the shell, the liquid distributor further being within functional
4 proximity of the hydrocarbon entry port.

1 24. The method of claim 13, wherein the vent gas entry port of the scrubber is
2 mounted on a disulfide separator.

1 25. A method for removing disulfide oils from a vent gas stream having
2 disulfide oils, comprising the following steps:

3 (a) providing a scrubber, the scrubber having a shell, the shell having
4 an interior cavity, a diameter, a vent gas entry port, a vent gas exit port, a hydrocarbon
5 entry port, and gas/liquid contact material, the gas/liquid contact material located within
6 the interior cavity of the scrubber;

7 (b) introducing a hydrocarbon stream into the scrubber through the
8 hydrocarbon entry port, the hydrocarbon stream comprising a least one hydrocarbon, the
9 at least one hydrocarbon having a boiling point of between about 180°F and about 430 °F;

10 (c) introducing the vent gas stream into the scrubber through the vent
11 gas entry port;

12 (d) absorbing a portion of the disulfide oils from the vent gas stream
13 into the hydrocarbon stream to form an exiting vent gas stream; and

14 (e) removing the exiting vent gas stream from the scrubber through the
15 vent gas exit port.